STATE UNIVERSITY OF NEW YORK AT STONY BROOK

Institute for Terrestrial and Planetary Atmospheres

Program of Study

The Institute for Terrestrial and Planetary Atmospheres conducts a teaching and research program for students interested in the physics, chemistry, and dynamics of the atmospheres of Earth and other planets. The Institute is affiliated with the Marine Sciences Research Center. Opportunities are offered by the center for research in a broad range of activities in atmospheric science and atmosphere-ocean interactions. Approximately five years are generally required to complete the Ph.D. after receiving the bachelor's degree.

Each graduate student's program of study begins with learning the fundamental principles of atmospheric sciences through course work. At the same time, students are encouraged to join an ongoing research activity, increasing their degree of responsibility. Completion of the degree program thus entails a thorough understanding of the principles of atmospheric science and their application to significant problems.

Research is done on a wide range of problems relating to terrestrial and planetary atmospheres. Research is carried out in state-of-the-art laboratories, by ground-based remote sensing at various locations around the earth, by analysis of conventional and satellite data, and by the development and analysis of theoretical and numerical models. Research is being performed to better understand past climate changes as well as to predict the future climate. Comprehensive data sets are analyzed as are the results of global three-dimensional climate models together with results of simplified models. Cloud-radiative effects on climate are of particular interest and are investigated in models and by analyzing satellite data from the Earth Radiation Budget Experiment. Satellite data, models, and conventional data are also analyzed to better understand the influences of latent heat release in the tropics on global climate. There is extensive activity aimed at better understanding the physical basis for predictions of the size and timing of future greenhouse warming. There are also research efforts within the Institute to understand the environmental effects on the atmosphere of current and future aircraft operations.

Atmospheric chemistry is another area of emphasis. Experimental research has been carried out for nearly a decade using state-of-the-art remote-sensing equipment to measure stratospheric ozone and those chemicals that catalyze its destruction. Mass spectrometric measurement of the abundance of stable isotopes of atmospheric gases, including methane and carbon monoxide, are carried out to help obtain better estimates of their sources and sinks. The Institute is analyzing daily global measurements of stratospheric energetics, composition, and dynamics from NASA's Upper Atmospheric Research Satellite. The Institute is involved in continuing activity in the modeling of global tropospheric chemistry. Several faculty members are investigators on NASA's Earth Observation System, which is the most comprehensive planned international investigation of the global climate system. There is also research activity on the physics, chemistry, and evolution of terrestrial and planetary thermospheres-ionospheres, including those of Mars, Venus, and the outer planets and their satellites. Research is also carried out in a state-of-the-art infrared spectroscopy laboratory to determine those molecular parameters, such as line shape and strength, that are needed for atmospheric heating calculations as well as for remote sensing.

Research Facilities

The Institute computer facilities include a VAX 6310 and a VAX 6510 with vector processing capabilities, as well as workstations, printers, graphics terminals, and hard-copy plotters. An IBM 3090 is also available at the University Computer Center. The spectroscopy laboratories are equipped with infrared (grating) spectrometers, low-temperature absorption cells, a tunable diode laser spectrometer, and a high-resolution Fourier-transform spectrometer. Students have access to millimeter-wave remote-sensing equipment, specially developed at Stony Brook, and to data from the Infrared Telescope Facility, Pioneer Venus, and the Earth Radiation Budget Experiment.

Financial Aid

Assistantships and fellowships provide a stipend of $9204 for the 1995–96 academic year, depending on student status after tuition payments. Summer research assistantships with stipends of up to $3800 are available.

Cost of Study

The tuition fee for the 1995–96 academic year is $4000 for residents of New York State and $7400 for out-of-state students. Miscellaneous fees, such as insurance and activity fees, total approximately $300.

Living and Housing Costs

In 1995–96, estimated living costs are approximately $500–$900 per month for single students living on campus. Off-campus rentals in communities surrounding the Stony Brook campus are also popular with graduate students.

Student Group

At any given time, about 25 graduate students are engaged in research in atmospheric sciences in collaboration with the faculty members shown on the reverse side of this page.

Location

Stony Brook is located about 60 miles east of Manhattan on the wooded North Shore of Long Island, convenient to New York City's cultural life and Suffolk County's tranquil, recreational countryside and seashores. Long Island's hundreds of miles of magnificent coastline attract many swimming, boating, and fishing enthusiasts from around the world.

The University

Established thirty years ago as New York's comprehensive State University Center for Long Island and metropolitan New York, Stony Brook offers excellent programs in a broad spectrum of academic subjects. The University conducts major research and public service projects. Over the past decade, externally funded support for Stony Brook's research programs has grown faster than that of any other university in the United States and now exceeds $90 million per year. The University's internationally renowned faculty members teach courses from the undergraduate to the doctoral level to more than 17,000 students. More than 100 undergraduate and graduate departmental and interdisciplinary majors are offered. Extensive resources and expert support services help foster intellectual and personal growth.

Applying

Students applying for graduate study should hold a B.S. degree in such fields as physics, chemistry, mathematics, engineering, or atmospheric science. Applicants may write for additional information about admission and financial aid to a graduate program faculty member whose research is of primary interest to them or write to the Institute director. Applications should be received by March 1 for September admission.

Correspondence and Information

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State University of New York at Stony Brook

THE FACULTY AND THEIR RESEARCH

Robert D. Cess, Distinguished Professor; Ph.D., Pittsburgh, 1959. Radiative transfer and climate modeling, greenhouse effect, intercomparison of global climate models.

Robert L. deZafra, Professor (Department of Physics with joint appointment in Marine Sciences Research Center); Ph.D., Maryland, 1958. Monitoring and detection of trace gases in the terrestrial stratosphere, changes in the ozone layer, remote-sensing instrumentation.

Jane L. Fox, Professor; Ph.D., Harvard, 1978. Aeronomy of Earth and other planets, chemical and thermal structures of thermospheres and ionospheres, airglow and aurora, atmospheric evolution.

Marvin A. Geller, Professor and Director of Institute for Terrestrial and Planetary Atmospheres; Ph.D., MIT, 1969. Atmospheric dynamics, stratosphere dynamics and transport, climate dynamics.

Sultan Hameed, Professor; Ph.D., Manchester (England), 1968. Analysis of climate change using observational data and climate models, interannual variations in climate, climate predictability.

John E. Mak, Assistant Professor; Ph.D., California, San Diego, 1992. Isotopic analysis of atmospheric gases.

Prasad Varanasi, Professor; Ph.D., California, San Diego, 1967. Infrared spectroscopic measurements in support of NASA's space missions, atmospheric remote sensing, greenhouse effect and climate research, molecular physics at low temperatures.

Duane E. Waliser, Assistant Professor; Ph.D., California, San Diego, 1992. Observational, numerical, and theoretical studies of ocean-atmosphere coupling in the tropics.

Minghua Zhang, Assistant Professor; Ph.D., Academia Sinica (China), 1987. Atmospheric dynamics and climate modeling.